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UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Marketing Service
Washington 25, D. C.

STANDARDIZATION STUDY -- CANNED TOMATO JUICE -- 1956

Evaluation of Methods of Classifying the Color of
Canned Tomato Juice

The problem and need of work.

The rating for color of tomato juice and certain other tomato products, in accordance with the United States grade standards, is determined by comparing the color of the product with the color produced by spinning certain combinations of Munsell color discs. These discs are so arranged that the color cut-off points for the grade of tomato juice is established by the percentages of the red and yellow colors in the disc, the remaining part of the disc being composed of any combination of grey and black.

Extensive work done by the Department indicates that the accuracy of this method is dependent on the use of a standardized light source and discs of which the color and gloss are standardized to within close limits. As a result of this work the Macbeth-Munsell disc colorimeter was developed and is being used by the inspection service in making color determinations on tomato juice and other tomato products.

There have been instances of differences in color classification of canned tomato juice by processors with their equipment as compared with the equipment used by the inspection service.

It has also been pointed out that the standardization of the gloss of the Munsell colors and the setting of the combination of grey and black in the spinners may have in effect changed the color cut-off points in the grade standards.

Objectives.

The objectives of the study are to --

(1) Compare the color evaluation of canned tomato juice by the inspection service and by industry.

(2) Correlate the results of the color evaluation by other methods with the Munsell color standards.

(3) Use the data for testing a simpler method of visual color classification, such as by the use of plastic color comparators.

Plan.

(1) Samples of canned tomato juice will be obtained from representative processors in the principal producing areas. A sample of 24 cans of No. 2 or No. 303 (12 cans of No. 3 cylinder if smaller sizes are not packed) will be drawn from the mid-season pack at each plant and another equal sample drawn from late season juice, a total of two full cases from each plant. Each sampling should be made from the same line and filler and in consecutive order if possible in order that all containers in each sample may be as nearly identical as possible.

(2) All samples will be shipped to:

Leonard S. Fenn
Processed Products Standardization and
Inspection Branch
Fruit and Vegetable Division
Agricultural Marketing Service
U. S. Department of Agriculture
Room 0725 South Building
Washington 25, D. C.

(3) From the samples assembled in the Washington laboratories two containers from each set of samples (or one No. 3 cylinder can) will be sent to the laboratory of each cooperating organization for their color evaluation. Each cooperating canner will also receive two cans (or one No. 3 cylinder can) from each sampling of their own juice.

Participants in color evaluation.

The following organizations will participate in the color evaluation of the samples:

National Cannery Association (Washington Laboratory)

National Cannery Association (Berkeley Laboratory)

Continental Can Company (Chicago Laboratory)

American Can Company (Maywood, Illinois Laboratory)

Participating canners will evaluate the color of their own juice.

Data to be obtained.

Laboratories.

The color of each sample will be evaluated by method No. (1) and method No. (2) listed below and by such other method or methods as facilities will permit:

(1) Evaluate the color of each sample by means of the Munsell color discs and assign the color score in accordance with the United States Standards for Grades of Tomato Juice. Report the details of the light source and type of spinner used.

(2) Determine the color values of all samples on a Hunter color and color difference meter standardized against a standard tomato red reference plate which will be furnished by the U.S.D.A. Make reflectance measurements on the juice, using a viewing cell consisting of a colorless plastic tube 3 inches in height by 2-1/2 inches outside diameter, cemented to a bottom piece of optically polished glass measuring 4-3/4 by 3-5/8 by 1/4 inch in thickness. Make the determinations without the separate glass plate, using the L scale. The plastic block with the 2-1/4 inch circular aperture and the small area illumination (3/8 by 5/8 inch) will be used.

Determine and record the "L" (lightness to darkness); the "a" (green to red); and the "b" (blue to yellow) reflectance readings.

(3) Color may also be evaluated by any other instrument or method for which the participant may have facilities. Such methods may include (a) Agatron; (b) Beckman; (c) any other instrument which will give an objective measurement of the color of the juice.

Canner.

The canner's evaluation of color should be made by means of the Munsell color discs as outlined in the grade standards. If the canner does not have Munsell color discs and spinner the facilities of the nearest inspection laboratory can be used without cost to the canner.

Reporting color data.

All data on samples will be forwarded to Leonard S. Fenn, U.S.D.A., Washington, D. C., for compilation and analysis. Data will be recorded on data sheets furnished by U.S.D.A. similar to the attached form.

Industry sample cutting.

After the data have been assembled it is planned to hold a cutting in the Eastern, Midwestern, and Western areas where each sample will be examined and the data and sample discussed. Cannery cooperating and other interested tomato products packers will be invited to participate.

Check samples will be retained by the U.S.D.A. so that sufficient duplicate samples will be available for study at each of these meetings.

October 5, 1956



